Remarks

Applicants have made a minor editorial change in paragraph 0014 of the specification to eliminate a possible redundancy in the use of the word "torque."

Applicants have made a minor change in the last line of claim 1 by adding the word "vehicle" to improve readability. This is merely an editorial change that does not affect the scope of the claim. In claim 2, Applicants have made a similar editorial change at line 12.

Applicants request a reconsideration of the final rejection of claims 1-11 under 35 U.S.C. § 103(a). Each of claims 1-11 is rejected as being unpatentable over Tabata et al. (U.S. Patent 5,887,670) in view of Taniguchi et al. (U.S. Patent 5,846,155).

The primary reference '670 patent is not relevant to Applicants' claimed invention for the same reasons that Applicants pointed out in the Amendment dated January 9, 2006. That Amendment was responsive to a rejection of the claims under 35 U.S.C. § 102. As previously indicated, in a known hybrid electric vehicle powertrain of the kind shown, for example, in U.S. Patent 6,994,360, energy from the planetary gear set and energy from the motor are coupled at the countershaft gearing. This presents a problem if there is a need to run the engine to charge the battery while the vehicle is in reverse vehicle drive. During reverse drive, the motor is the power source, not the engine. Thus, with the known powertrain arrangement, the motor must generate enough power to overcome ring gear torque and also move the vehicle in a reverse vehicle drive direction at a desired speed when the engine is powering the generator to charge the battery. In contrast to the known hybrid electric vehicle powertrain arrangement, the present invention makes it possible to achieve improved reverse vehicle drive performance when the battery SOC is low. This is done by providing a clutch in a torque delivery path from the planetary gear unit to the motor driven gearing so that the planetary gear unit can be disconnected from the final drive. This allows the engine to drive the generator, which results in a series hybrid configuration. An additional advantage of

Applicants' invention is the ability of the engine to be started using generator power as the generator acts as a motor. With the planetary gear unit disconnected from the final drive, there is no added torque requirement for the motor during an engine start when the motor is driving the vehicle in reverse.

The features outlined above are neither suggested nor disclosed in either the '670 patent or the '155 patent. These reference patents do not disclose a counterpart for Applicants' motor 74. As in the case of Applicants' invention, where a motor-generator is shown at 40/40', each of the reference patents discloses a motor-generator. The motor-generator of the '670 patent is shown at 14. Neither reference, however, discloses a counterpart for Applicants' motor 40/40'. The motor-generator of the '155 patent is shown at 5. It is impossible to apply the language of claims 1-10 to either of these references taken alone or in combination.

The primary reference '670 patent, contrary to the Examiner's comment in paragraph 1 on page 2 of the Office Action, does not disclose a reaction brake that anchors the ring gear during operation of the powertrain in a reverse driving power delivery mode. Reverse drive is achieved in the case of the powertrain of the '670 patent by the transmission 10, together with the gearing shown at 20. Reverse drive is achieved in the case of the powertrain of the '670 patent by engaging clutch C_0, clutch C_2, brake B_4 and one way clutch F_0. Reverse drive is not achieved in the case of the powertrain of the '670 patent using an electric motor. Indeed, an electric motor corresponding to Applicants' electric motor 74/74' is completely lacking in the design of the '670 patent as indicated above.

Further, the design of the '670 patent does not include a clutch between the ring gear 16r and the torque output element 26, contrary to the Examiner's discussion on page 2 of the Office Action of April 7, 2006.

The motor of the embodiments of Applicants' design is isolated from the ring gear when the clutch 62 of the Figure 2 embodiment or the clutch 90 of the Figure 3

embodiment is disengaged. The recitations in the claims dealing with this feature clearly are not applicable to the teachings of the '670 patent because, among other reasons, the '670 patent does not disclose a motor that corresponds to Applicants' motor. These recitations in the claims cannot be applied to the teachings of the '670 patent.

The brake B_0 disclosed in the '670 patent clearly is not a counterpart for Applicants' recited reaction brake, which is released during operation of the powertrain in a split power delivery mode in a forward vehicle driving direction.

The secondary reference '155 patent does not supply any of the deficiencies in the primary reference '670 patent. The '155 patent discloses a brake that anchors the ring gear R of the planetary gear unit 6, which is applied to achieve reverse drive. That brake is entirely unrelated to Applicants' brake, which anchors the reaction element of the planetary gearing to effect engine power delivery to the generator to cause the generator to charge the battery when the SOC is low during reverse vehicle drive. Furthermore, like the teachings of the '670 patent, the teachings of the '155 patent do not include a motor that is a counterpart for Applicants' motor 74/74'. Further, it should be noted that the clutch Cd of the design of the '155 patent is used to achieve regenerative braking. It is released during reverse drive. Clutch Ci also is released. There is no possibility, therefore, that the engine could power the motor-generator to charge a battery during reverse drive when the motor-generator acts as a motor.

The teachings of the '155 patent contain no suggestion for modifying the design of the '670 patent. Contrary to the discussion of the Examiner in the last paragraph on page 3 of the Office Action, the design of the '670 patent could not be capable of achieving reverse drive by designating a motor mode for the motor-generator to drive the vehicle using the motor-generator while the engine is in an idle state.

It is respectfully requested that the Examiner withdraw the final rejection and allow claims 1-11. Applicants encourage the Examiner to call Applicants' attorney at (248) 358-4400 if there are any questions about Applicants' position.

Respectfully submitted,

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